THE
REGISTER OF PENNSYLVANIA.

DEVOTED TO THE PRESERVATION OF EVERY KIND OF USEFUL INFORMATION RESPECTING THE STATE.

EDITED BY SAMUEL HAZARD.

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REPORT OF THE INSPECTORS OF THE
WESTERN STATE PENITENTIARY.

[Concluded from p. 184.]

REPORT OF RELIGIOUS INSTRUCTOR.

To the Board of Inspectors of the Western Penitentiary.

GENTLEMEN:—In reply to a note handed to me at your last meeting; the following is respectfully submitted.

I am asked to give a detailed report of the state of morals and religion in the prison. This question might probably be answered in the most satisfactory manner, in the form of a *list*, placing the previous and present character of each convict, in parallel columns with his name, as furnished by the state prison at Auburn, in relation to discharged convicts, and found in the reports of the prison discipline society. This however, it is presumed, was not expected, and is, under present circumstances impracticable.

It is certainly safe to say in general, that the flame of virtue in the breasts of these poor fellows, burns but feebly; and as to *religion*, in any degree, it seems as yet a delicate matter to affirm There are some, it is true, of whom, in relation to morality, the fact that they are convicts, is about the worst that could be said; others there are who seem to know but little, in relation to the claims of true morality upon them, and practice as little as they know. There is a third class, who seem to make a deliberate choice, and are willing as far as is compatible with the small degree of liberty they enjoy, to dispense with morals in both theory and practice.—And these I think make up the principal classes of the inmates of this prison.

You ask *what course has been adopted as to the religious instruction of the prison.* The peculiar circumstances that characterise the institution in this respect have made it impracticable to adopt any regular system of instruction, such as seems to have been provided for, and adopted in other institutions of the kind, in different parts of the country.

Any instruction they have received, has had to be given to each convict separately, in the way of conversation through the grated door of his cell.

Through the kind benevolence of the different bible societies of Pittsburg, we have been furnished with a copy of the scriptures for each convict, with permission that as many as choose might retain their bibles, as private property, at their discharge. Of this privilege they have generally availed themselves.

As the number of convicts during the last year, has averaged about sixty, it was found impossible to visit each convict for conversation as already mentioned, excepting at considerable intervals. For the purpose of remedying this inconvenience, as far as practicable, we supplied ourselves with tracts, and made it a rule to see each convict at least every Sabbath and leave a tract with him for his perusal, through the week; we also conversed with as many as our time would allow.

I am asked *what amendment, to the present plan of instructions, if any, are required.* If I understand the bearing of the question, I can only say in reply, that the structure, circumstances and laws, of the prison seemed to leave us no alternative as to the plan of instruction. Amendments would unquestionably be desirable, but so far as my judgment and invention can find out, they must be adopted by first making them practicable. This I think will require a material alteration in the present arrangements of the institution, and least I should be going further than is asked of me, or than would be in accordance with the policy of an *established system or unfinished experiment*, I will leave this question, with those to whom it more properly belongs.

You enquire *what portion of my time is occupied with the prisoners in their instruction.* In this I have been governed somewhat by circumstances, and have not been confined entirely to any particular portion. One of my fellow students, and myself have devoted regularly the forenoon of every Sabbath, and sometimes a portion of the evening. For a few months we were assisted in the same way by a third person. We have also been in the habit of visiting them through the week, as our other engagements would admit of it.

You ask me *what are my impressions as to the influence of solitary confinement on the prisoners, in morals and religion, so far as this prison is adapted for the purpose.*—This is a question which has been presented to my mind about every time I have gone through the prison, for more than a year. And in the decision of it *for myself*, after so long experience and observation, I have no difficulty. If the object of the system be the reformation of the offender, and this prison in its present state is to be considered a specimen of the means by which this result is to be secured, I have no hesitation in saying, and I think the same testimony will be borne by every one concerned in its daily management, that it is an entire failure. And I see no reason why the institution should continue to be supported as a dead charge upon the *state* and *county treasuries*, in the hope of making good citzens and moral men of the prisoners, if the prison, in its present state and with its present conveniences, be the only foundation for such a hope. I am well aware that there is a moral lesson in solitude, awfully impressive, and that cannot be disregarded; that it impels to reflection, and that reflection is the uniform precursor of reformation; but that is not the question, which I undertake to decide. The word *solitary* as applicable to confinement in this prison, means only that there is but one convict in one apartment. But the adjacent position of the cell doors and the open vestibule into which they front, makes it entirely possible, and but little inconvenient for an idea whether good or bad, clean or unclean, to pass through the mind of every prisoner in the same division in a minute of time. The intercourse is to all moral and religious effect unrestrained, and then there are all the suggestions of idleness and impatient confinement to corrupt it. And as morals and religion could not be expected to originate with much force or purity, or even find very firm advocates in such minds, the effect of this intercourse so generally unobserved, will of course be every thing but salutary.

But there is something more than a negative evil in this matter. Among convicts, as among so many individuals promiscuously selected in another way, there are, of course, grades and varieties of character—the corrupting influence of "evil communications. The downhill tendency of human depravity, is as necessary, and as real, in a prison, as in any other circumstance of

life, and here there is wanting all the advantage of a valuable and unimpeachable character to resist it. This has been our painful observation in relation to morals and religion in this prison. We have seen the youthful culprit, who may probably have been surprised in his first criminal adventure, and who under the chagrin of failure and disgrace, might have yielded a willing attention to moral suasion and religious motive, placed in the neighbourhood and under the voice of a shrewd infidel, or old offender, to be lectured into systematic impiety, and familiarity with crime. This is one of the ways in which *moral reformation*, I have no doubt, is often impeded, and perhaps it would not be too much to say, *moral ruin* in some cases made sure. But this evil may be considered accidental in its occurrence and partial in its effects. Another one is, I think, general and tending to the same result. The prison is supplied with tenants, principally from two general classes of human beings. One of these may be called the roving class, who may be said to be without a home, without local attachments and some of them almost without a country. The other class is generally composed of such as have been seduced by idleness, bad management, or intemperance into acts of dishonesty, in consequence of which some of them have been found in, and taken from obscure homes in the country, for the purpose of punishment. Here these two classes are indiscriminately the companions of each other; in which constrained association, the latter class, comparatively harmless before, are doomed to learn the ways of the world from a set of boisterous blackguards to become acquainted with a degree of wickedness, they probably never saw or heard of before; and in some cases to become as reckless as their new associates.

If the substance of intercommunications that often fall from cell to cell were written down and presented, I have no doubt it would be enough to convince every one, that all that has been said is neither fancy nor exaggeration. It is a common place circumstance in this prison, and I think will necessarily be so, unless adequate measures are taken to prevent it, that a single old offender is able to make his own sentiments and deportment, relative to moral and religious subjects, common to all within the compass of his voice. And there is no room for a doubt, but that every idea in the science of roguery or of impiety, which his experience may have furnished him, will have been fairly put in possession of every one that can hear him. And certainly it would not be strange if a conversation of ten minutes, repeated once in the week, which would be as much as could reasonably be accomplished among so great a number, should fail in counteracting the evil influence thus constantly exerted. What would be the natural result of all this, as it bears upon the interest of religion and morals, seems pretty obvious; and our experience has tremendously confirmed this natural apprehension. We have often been met with the complaint, that an attempt at serious demeanor has to stand up against a constant sally of jeer and ridicule that they are unable to endure. And we have learned, to our great discouragement, that impressions have been often, in this manner, obliterated in less time than they were made. The above remarks refer principally to the male convicts. The situation and circumstances of the females, in this respect, is more discouraging still. In their case there is no separation in the day time, but they are left to run together, and unobserved of course, in a small yard, and there is even but a partial separation at night—several sleeping in the same night room. It is to be expected that there will be among them a predominance of confirmed vicious habit, which will of course give character in an important degree to their intercommunications. The most heaven daring profanity that ever broke upon my ear, was mouthed by a female in this prison yard. I suppose it is true of this instance, if it ever was of any, that "every good principle is eradicated, and every evil one implanted;" and I am unable to see how any female, though driven by scanty wages and craving wants to an act of dishonesty, can be reasonably expected to retain through a year's confinement in such company, moral sense enough to resist the temptations that await her restoration to liberty. Under present circumstances, we have been compelled to consider the case in relation to them as hopeless; and I can only say, that if religion and virtue be worth any thing, and it be a real misfortune to want the one and lose the other, they are really objects of pity, and something should be done for them, which as the case is we cannot do. If it be the design to continue the present mode of confinement, I do think that the humanity which ought to be felt and exercised towards the worst class of human beings upon earth, would dictate that every possibility of their corrupting each other should be precluded, by preventing intercourse of every kind. Perhaps it would meet the approbation of the proper authorities, should such a measure be adopted, to mitigate the severity of it by the provision of a small *library*, consisting of books of practical *morals* and *religion*, which could be placed under the direction of the person who might be intrusted with their religious instruction. If such a measure be approved, I have no doubt the benevolence of private individuals in Pittsburg and the country around, will relieve the public of the expense of such a provision. And the probable advantage of it will, I think, appear obvious to all. This solitary confinement without labour, creates a kind of intellectual appetite, which relishes a kind of reading that would in all probability be neglected or spurned by the same person in possession of his liberty. The most abandoned, if he be given in any measure to the exercise of the mind, is glad in this way to beguile the tedium of the hours; and thus an avenue is opened to the heart of the man, for the admission of the most wholesome sentiments.

In this way we have been able to make our visits acceptable, and even in some cases longed for.

We can freely say, that under all the inconveniences with which we have had to contend, we have found it a comfortable exercise. We have found the most reckless, willing to receive our approaches with an apparent cordiality, and excepting a few desperate cases, we have found them willing to unbosom themselves with freedom, and tell us the worst of their case. It has sometimes been our privilege to witness the hardy offender subdued by kindness, and even weep in view of his everlasting prospects. And what is not the least of all, we have been permitted to attend upon the last hours of the incarcerated victim of disease, and speak to the honest conscience of a dying man, in this home of bereavement. Enough has transpired in our experience to show to our satisfaction, that even under all the disadvantages of the case, moral and religious instruction afforded to this unfortunate portion of our fellow creatures, is not entirely thrown away.

A. D. POLLOCK.

[The tabular statement of Warden (marked C.) has not been received.]

From the Albany Evening Journal.

RAIL ROADS AND CANALS.

No. II.

That Canals are superior to Rail Roads for slow motions, and even when motion is accelerated to considerably beyond the usual rate at which Canal boats are track'd, has, I think, been shown in my last. I mean now to look a little into the comparative advantages and cost of double Rail Roads and Canals. I say double Rail Roads, because I do not consider that a single track Rail Road can compete with a Canal under any circumstances, when either at will can be adopted. In both cases horses must be used, and then a Canal will be seen to be best, by referring to the tables in my last number.

And if it is enquired, why horses only can be used on

a single track? I answer, that a locomotive engine and train of seventy tons, hurling along at twenty miles an hour, cannot be stopped at will; and when stopped, it must have room to get agoing again—I suppose one-half should be allowed, either to stop in or to get up to speed. Then if a locomotive carriage has the even chance of meeting another every mile, she will be continually whipping up, or holding in; a state of things (independant of the difficulty of getting a train of thirty cars turned from the track) not the best fitted to display the powers of a locomotive engine, in their highest perfection.

These remarks, however, will not apply to short Rail Roads, where the carriages can all pass one way for a certain period, and all return during another period—there can be no meeting or turning out in this case.

A Canal, it will be readily admitted, is the only proper way of connecting a lake and river, or two sheets of navigable water, when the portage is but short. For it cannot be advantageous, when continued navigation can be had, to break up a cargo—put it in wagons—and then load it again in boats, after it has been transmitted a few miles. But when we are to plan an improvement, along a river where there is plenty of water, unless that river be a torrent and have very many locks, I think a Canal decidedly the best.

In locating a Canal along a river, and dropping down a few feet every mile or two, an engineer has it in his power to choose the best ground. He commands the country, and can descend fast or slow at will, by changing the location of locks. And in passing by bad *points of rocks*, or wash banks, he need only make his works high enough to secure them against river floods.

Not so with a Rail Road: there the engineer must conform to his grade—he cannot descend fast in one place, and slow in another. For suppose the Rail Road is planned so that an engine can be loaded, going to market and returning, to equal her full power, then if there be an excess of tonnage in one of these directions the road should descend to favour the heaviest trade. To be more explicit—if such an article as coal is to be brought down a river to market, and there are no return cargoes, the grade should be about eighteen feet to a mile. At this rate of descent, a horse or engine may bring a very heavy load down, but can only carry back the empty cars. I take this rate of descent (eighteen feet to a mile,) from some careful experiments, made with the dynamometer on the Stockton and Darlington Rail Road.

If the engineer then fixes his maximum grade at eighteen feet per mile, and he has to pass by a wash bank or point of rocks where this grade will bring him ten feet too high—what can he do? Why, says the reader, locate an inclined plane. Well suppose we do so. We go on to another *point of rocks*, and are again too high. Shall we locate another inclined plane? Be it so. Proceeding thus, we shall have a Rail Road with short inclined planes, and at each of these we must *haul up* with a stationary power. Think of delay, at the foot of each of these inclined planes, and what a string of cars there would be accumulated—recollectlng that each engine and train would be near 300 feet long.

The only way of improving on this state of things, would be to run the Rail Road at its grade, until thirty or forty feet of descent could be let down at once. But great expense would attend this, in passing some of the water gaps and points, where the road would be far higher than necessary for its safety against the river, and therefore very expensive. For it is known that a few feet added to an embankment already high, greatly increases the expense. Therefore, passing wash banks and *points of rocks*, a Canal must be as cheap, and is likely to be a great deal cheaper than a Rail Road.

When we get on the river flats, or on a Savanna, the Canal greatly displays its superiority. Here we often come to places where the Engineer can lay his level so as just to skim the earth, get a light bank on one side, and his work is done—a Canal is made. But in a like case, a Rail Road is only begun; the grading, as it is called, is finished. This is but a small part of the expense. In a case like the above, where the canal might cost $3,000 per mile, exclusive of locks, the Rail Road would cost 12,000. Add to the Canal (for 18 feet lockage,) $3000 per mile, (the locks being of wood, as the railway is wood) and we have a Canal in the same situation as a Rail Road for half its cost.

We must further charge against Rail Roads, the loss of time, and also the trouble with the embankments, which will settle after the rails are down; and also the risk of the stoppage of one or both tracks by land slides, which will always occur in some soils, especially in deep cuts. We know that a canal would not be seriously impeded by a *slip* that would shut up a Rail Road.

When we consider Rail Roads inclined to the horizon at different angles, new and important results of the action of powers, are presented. In the following table I have drawn out a statement of the force of horses drawing loads up inclined planes. I suppose a horse to draw on a level 10 tons, and have given the rise in feet per mile, and the angle of elevation.

Rise per mile.	Angle of elevation. ° ′ ″	Power of a horse. lbs.
Level	0 0 0	22,400
5 feet per mile	0 32 33	19,968
8 " "	0 52 06	18,015
10 " "	1 05 06	16,343
12 " "	1 18 06	15,333
14 " "	1 31 10	14,023
16 " "	1 44 11	12,692
18 " "	1 57 13	11,731
20 " "	2 10 15	10,087
22 " "	2 23 16	8,749
24 " "	2 36 19	7,435
26 " "	2 49 21	6,124
28 " "	3 02 23	4,813

In this table, a horse is supposed to exert a power of 150 lbs. and goes at the rate of only two miles an hour, if his velocity increases, his power rapidly decreases. If he ascends a plane of 18 feet rise per mile, at the rate of four miles an hour, he can only draw 7508lbs.; at nine miles an hour, 4223 lbs. As we take higher velocities and steeper grades, the canal will still entirely maintain its ascendency.

But the horse, so little adapted to these uses, is fortunately for rail roads and for the progress of civilization, not the only power that can be adapted. The locomotive engine gives us a movement that only looses by the resistance of air, and by escaping from the moving power, as a vessel escapes from the wind that presses her on.

To engines, the difficulty of ascending grades does not apply with as much force as it does to horses. There is with engines however, a loss of power in this case, and the loss will be for every horse power as in the table above it can be seen to be for a single horse. On a level, a ten horse power engine will draw 224,000 lbs., at 18 feet to the mile, she will lose power, and draw 117,31 0lbs., or a little more than half, and on an ascent of 28 feet to the mile, she can get up at the full speed, with only 48,013, or about 1-5th of her load on a level. These results are deducible from premises not to be doubted; and although the splendid expedition at Liverpool is calculated to astonish us, as to the effect of that tremendous agent, steam, still they ought not to mislead us. Viewed calmly, they show only what might have been known; that a great power would force up a hill, a great weight; that friction is constant, and that at very considerable declivities, a locomotive engine will not slip back when not overloaded.

NEW YORK.

OPINION OF JUDGE DARLINGTON.

James Bunting, Adm'tor of Robert Bunting, jr. dec'd,
vs.
Samuel Bunting, Adm'tor of Robert Bunting, dec'd.

Sur. rule to show cause why the report of Arbitrators should not be set aside.

The facts of this case, as disclosed by the evidence, appear to be, that the cause was arbitrated under the provisions of the act of 20th March, 1810; that the arbitrators met, according to appointment, and made a report in favour of the plaintiff for the sum of $653 40, on the 2d day of October, 1830. This report they transmitted to the prothonotary, by mail, in a blank envelope. The prothonotary received it from the post office on the 4th of October, 1830, and, on opening it, supposed he discovered a material omission on the part of the arbitrators, in not stating that they had been duly sworn or affirmed; he took it to the office, and ascertained who the counsel for the plaintiff was; to him the prothonotary showed the report, and the supposed defect was stated; the counsel informed him, that if the arbitrators or any of them were here, the prothonotary might get them to interline the *fact* of their being duly qualified, for he had qualified them himself. The prothonotary stated that he was going shortly to the neighbourhood of the arbitrators, that he expected to see all of them, and if it would be proper, he would take it and submit it to them, that the omission might be supplied. The counsel assented, and said he wished he would do so. Accordingly the prothonotary took the award with him, saw all the arbitrators, and one of them, with the previous assent of the other two, on the evening of the 7th, or on the 8th of October, at New London ⋈ Roads, made the interlineation of the words "being duly sworn and affirmed, and"—and on the 8th of October, at New London ⋈ Roads, the prothonotary wrote on the back of the report, "Filed Oct. 8, 1830;" he then returned it to the office, on the evening of the 11th of October, and his clerk entered it on the docket on the morning of the 12th. This is the parol evidence, for the docket showsn o entry on the 11th or 12th, except that of an appeal on the latter day.

The defendant, conceiving this proceeding to be irregular, and that after the report came into the hands of the prothonotary, he had procured a material alteration to be made in it, has obtained this rule to show cause why the same should not be set aside.

We think the defendant's counsel is mistaken in supposing the alleged alteration to be a material one. It is true, the tenth section of the act of 20th March, 1810, provides that "the arbitrators thus appointed and met shall be sworn or affirmed by an alderman or justice of the peace," or by the administration of the oath or affirmation by one of themselves, in the manner pointed out by the act; and we see no objection to the common practice of one of the attornies performing that duty in the presence, and by the authority, of the arbitrators themselves. They must be, however, actually sworn or affirmed, and it appears they were so qualified in this instance, but because they had not stated in their report that they were, the defendant supposed it was a fatal omission, of which he might have had advantage by setting it aside, but for the improper mode of supplying the defect. But this Court would not have set aside the award for that cause—the report was good and valid, if the arbitrators *in fact* were sworn or affirmed, the alleged procuration of the alteration by the prothonotary made it neither better nor worse. "It may be prudent for arbitrators to set out in their report that they were sworn or affirmed: if they were *not qualified*, that was a ground to be taken in the Common Pleas, a matter of fact to be made out by affidavit, but the omisssion to state it does not prove the fact that they were not sworn or affirmed, and consequently vitiate the award." Neely and another *vs.* Stewart, 10 Serg. and R. 207.) How far the Court would interfere, in case of such an award being altered in a material or immaterial part *by a party*, or at his instance, it is now unnecessary to consider, for this immaterial alteration seems to have been made more at the instance of the prothonotary than any one else.

The prothonotary, no doubt, acted with upright intentions, and under a belief that he was doing his duty and no more. We think he did more than his duty; and it may be well remembered by every officer, judicial or ministerial, concerned in the administration of justice between man and man, that it is enough for him to endeavour to do his duty well; for if he should go further, even with the most upright and honest intentions, and do an act which may be supposed to aid one party, or to deprive the other of some real or imaginary advantage, he will rarely escape the censure of him who thus believes his antagonist aided; and as there was a contrariety of opinion held at the bar during the argument of this case, as it respects the duty of the prothonotary, we will express our opinion upon it.

The tenth section of the act of the 20th of March, 1810, requires that the arbitrators "shall make an award, signed by all or a majority of them, and transmit the same to the prothonotary, within seven days after they have agreed upon their report, who shall make an entry thereof on his docket, which, from the time of such entry, shall have the effect of a judgment against the party against whom it is made, and be a lien on his real estate until such judgment be reversed on appeal." The burthen of transmitting the award to the prothonotary, is thrown upon the arbitrators, and if they neglect it, they forfeit their pay according to the twenty-fifth section of the same act. The arbitrators transmitted this award to the prothonotary by mail, and he received it on the 4th of October—his duty then was, not to carry it to New London ⋈ Roads, or any where else; not to keep it off the docket until the 12th, or even the 8th, of the month—not even to mark it filed—but to "*make an entry thereof on his docket*," so as to give it the effect of a judgment, and that surely with all convenient speed; for it is often a matter of great importance to the plaintiff, that he should secure a lien upon the real estate of the defendant as early as possible; and a prothonotary would run a fearful risk, if after an award had been transmitted to him, he should for any cause, and with however pure but mistaken motives, delay entering the award on his docket for several days after it had been transmitted to him, whereby the plaintiff should lose his lien, and finally his debt. It seems to have been apprehended by the prothonotary and the counsel for the plaintiff, that this award had one character before it was marked "filed Oct. 8, 1830," at New London ⋈ Roads, and another after that event; indeed, the prothonotary stated in his evidence, that "he did not consider it an official paper until it was marked filed by my (his) hand." A little examination will put this matter right, and it will be seen that even if it be necessary that an award should be *filed* to give to it, or to add to its validity, still the endorsement of *the time of filing* has no such effect.

A *File* (filacium) in its original meaning signified a thread, string, or wire, upon which writs and other exhibits in courts and offices are fastened or *filed* for the more safe keeping and ready turning to the same.* In more modern times the word means a bundle of papers tied together, with the title of each generally endorsed—the mode of arranging and keeping papers being changed without a change of names.† Thus all the papers properly belonging to our public offices, are or ought to be filed: all the papers belonging to the Prothonotary's Office of this court are filed—whether they be writs, declarations, præcipes, awards, affidavits, &c. they are all regularly *filed* and are matters of record; yet a large proportion of them are filed without the

* Jacob's L. Dict. voc. File.
† Webster's Dict. voc. File.

time of filing being endorsed: all the writs, all the early declarations, many awards, and other papers, are regularly filed, and preserved as records without any endorsement of the time of filing. Rules of practice now require the prothonotary to mark the time of filing declarations and other pleadings; and it is very convenient and useful to endorse the time of filing most other papers; but the endorsement of the time is not essential to the act of filing, and with regard to awards, neither the act of filing nor endorsing the time thereof, is essential to its character or effect; *it is the transmission of the award to the prothonotary, and his entering it on the docket with all convenient despatch*, which are the essential acts, not the filing or marking the time of filing. For a few years after the passing of the act of 1810, the uniform practice of the prothonotary of this Court was, upon the receipt of an award to endorse upon it *the time it was delivered to the prothonotary*, and to make the same entry on the docket. When or why this practice (which seems more consonant to the provision of the act of assembly) was changed to marking the *time of filing*, is not remembered, but the change is not for the better; for the time of delivery of the award to the prothonotary and entering it on the docket is the true time of its taking effect, and not the time of filing, or marking it filed.

In conclusion, we are of opinion,—

1. That upon the award being transmitted to the prothonotary, he ought immediately, or with all convenient despatch, to enter the same on his docket and file it in its proper file.

2. That this award was good and available, notwithstanding it did not state in the body of it that the arbitrators were sworn or affirmed.

3. That the procuration of that supposed amendment, did it neither good nor harm.

4. That its validity, or its official character, was not altered by endorsing upon it "Filed Oct. 8th, 1830," either in the office or elsewhere.

5. And that the defendent has no right to complain: he was not injured—neither by the delay of entering the award on the docket, nor the interlineation of the fact that the arbitrators were sworn or affirmed.

The Rule is discharged.

Reduced to writing and filed at the request of the defendant's counsel, January 31, 1831.

ISAAC DARLINGTON,
Prest. 15th Jud. Dis.

WEST CHESTER RAIL ROAD.

The following calculations on the business of Westchester are taken from a printed sheet sent to us.

The Legislature having granted a very fair and liberal charter, for this object—it only remains for those who are immediately interested, to avail themselves of its provisions, in order to secure their permanent prosperity. Every discerning mind must perceive, that it would be decidedly the interest of the *owners of real estate*, in West Chester and its vicinity, to construct the rail road, *themselves*,—even if it should never yield them one cent, in the form of *Dividends*, on the capital stock. *Ten per centum* on their property, would make the road in a substantial manner; and no one can doubt that the real estate in the Borough, and immediately adjacent, would be enhanced in value to more than that amount, upon the completion of the Rail Road.—Therefore, it is obviously the interest of the property holders to make the road, at once,—without any regard to Dividends.

But there are unquestionable data to shew, that the *existing* trade to West-Chester, and the country around it (without reference to *future* growth, or results,) will afford a good interest upon the stock: and consequently, that the investment will be a safe and advantageous one, for the surplus funds of capitalists. From a careful inquiry into the business *now* done, it appears that the transportation of *commodities*, to and from West Chester, and the district of country contiguous thereto, (consisting of dry goods, groceries, lumber, coal, iron, the various agricultural products, lime, limestone and marble, plaster, &c. &c.) amounts to upwards of *eight thousand tons, annually;* and it is estimated, that in the four lines of stages, which run between the borough and the city of Philadelphia, there are at least *thirty passengers*, on an average, travelling *daily*—or about *Ten Thousand* in the course of the year.

The actual cost of this amount of transportation may be shewn, by stating the routes on which it is distributed,—with the prices annexed:—thus,

4000 tons, to and from Philadelphia, at $4 per ton,	$16,000
600 tons from Columbia, at $8 per ton,	4,800
3600 tons from the Great Valley, at $1 50	5,400
8200 tons of commodities, of which the transportation costs	26,200
10,000 passengers between West Chester and Philadelphia, at $1,25 each, amount to	12,500
Aggregate of the present annual cost of transportation of commodities, and conveyance of passengers.	38,700

Now, if the cost of transportation of commodities be reduced, by a Rail Road, 50 *per cent.*—and of the conveyance of persons, 20 *per cent.*—then the annual expense, on the above trade, will stand thus;

On Commodities,	$13,100	
On Passengers,	10,000	
		$23,100
Which, being deducted from the present cost, will exhibit an *annual* saving of		$15,600

If to this *saving of expense*, we add the *certainty*, and *expedition*, of Rail Road communication,—it must be apparent that the benefits accruing to West Chester and vicinity, will be of immense importance. The effect of these advantages and facilties, upon the growth, population, and trade of the place, must be vastly beyond all former experience;—notwithstanding the recent demonstration, that the borough has more than doubled its population within the last six years.

Let us, then, upon these satisfactory data, form an estimate of the probable value of the *Stock*. Assuming the cost of the Rail Road at *one hundred thousand dollars*, the annual interest on that sum, at 6 per cent will be $6,000
Add 2 *per cent.* for incidental expenses, 2,000

The amount, per annnum, will then be $8,000

A toll of 62½ cents per ton, on the whole length of the West Chester Rail Road, will admit of a saving of more than 50 *per cent.* on the present prices of transportation; and 62½ cents per ton, on 8200 tons, make,	$5,125
A toll of 31 cents, each, for passengers, in like manner, will allow of a reduction of more than 20 *per cent.* on present charges; and 31 cents, each, on 10,000 passengers, make	3,100
Amounting in the aggregate, to	8,225
Deduct incidental expenses, as above,	2,000
And there remain, to be divided,	6,225

Or rather more than 6 per cent on the capital.

This calculation is based upon an estimate of the *present* business of West Chester,—and upon *tolls* only. But, if the company provide suitable vehicles, and establish a regular system of transportation,—their profits will be greatly enhanced. With Cars starting at regular, stated hours, and carrying persons and commodities, at a cheaper rate than can be afforded on any other route,—or by any other conveyance,—the *whole profits*

of transportation may be enjoyed by the company; and the accommodation of the public, at the same time, be complete. For example,—

The freight of *Commodities*, as before stated 8200 tons, at the reduced rates—is	$13,100
Of *Passengers*, 10,000, at the reduced rate—is	10,000
Making, altogether,	23,100
Deduct, for tolls on Penn. Rail Way, and for incidental expenses,	8,000
And there remain to be divided	15,100

Or, a dividend, on the capital stock, of 12 per cent. per annum; and a surplus of $3,100, to go to the contingent fund.

The foregoing estimate refers merely to the *actual* business of the district. But it requires not the gift of prophecy, to perceive, that when the Rail Road comes into operation, the *Town*, as already stated, must increase beyond all former example; and consequently, that the Trade upon the road must be augmented in like proportion. Being at a convenient distance from the city of Philadelphia,—and in a district of country distinguished for its salubrity, and improved agriculture,—the conveyance of Passengers, alone, during the summer months, to and from West Chester, will probably afford a handsome dividend upon the capital stock. During the winter season, when the Farmers are anxious to send their produce to market,—and when the other roads are almost impossible,—the Rail Road will inevitably command all the trade within reach of it; and will be felt as a great public benefit,—at the same time that it will be a most valuable property to the stockholders. That the stock, being of moderate amount, will immediately bear a *Premium*, and be in constant demand amongst those who have funds to invest there can be little doubt: And it will therefore behove such as may desire to possess it, to attend to the business when the Books are first opened.

A handsome lithographic map and profile of the above rail road has been kindly presented to us and may be seen at our publishing office, by those who desire to inspect it. (For the Engineers' report on the location, cost, &c. see page 115 of the present volume.)

ALLEGHENY PORTAGE.

Wm. G. Hawkins, Esq. *Speaker of the Senate.*

Sir—Having, in the absence of my colleagues, received the reports of the engineers, Messrs. Robinson and Long, relative to a portage road over the Allegheny mountain, which they, in conjunction with Major Wilson, were appointed to survey during the last summer, I herewith transmit the same to you in obedience to a resolution of the Senate of the 26th January last.

Very respectfully,
Your obedient servant,
JAMES CLARKE,
Canal Commissioner.

Canal Office, Harrisburg, March 14, 1831.

To the Board of Canal Commissioners of the State of Pennsylvania.

Gentlemen:—It appears that the several engineers appointed under the act of the 27th of March last, to inspect the several routes and report in relation to the Allegheny portage, concur in deeming a rail road preferable to a Macademized road, and in awarding their preference to "a route leading upwards along the vallies of Blair's Gap run, crossing the Allegheny mountain at Blair's Gap summit, and descending to Johnstown, in the valleys of Laurel Run and the Little Conemaugh;" but that two lines complying with the above conditions, are at issue before them; the one traced by the undersigned in 1829, and by him recommended to the canal commissioners, in his report of that year; the other traced by Lt. Col. Long, in the summer and fall of 1830.

As the opinions of the undersigned in regard to the superior eligibility of the line traced by him in 1829 remain unchanged, after a careful review of all the considerations, which appear to him to have an influence in the selection of a route, it now becomes his duty to say so, and to refer the board of canal commissioners to his report of 1829, and the accompanying documents for an exposition of his plans in detail.* In doing so he does not mean to say that on a review of the line many improvements on particular portions of it might not be made. On the contrary he has in the report above alluded to, pointed out changes which it would be desirable to effect, and alluded to blemishes which on a final adjustment of the line, it would be advantageous to avoid. But he is satisfied that the line in all its important features will be found the most advisable, and particularly in those by which it is distinguished from the line traced during the past season, by Lt. Col. Long.

The undersigned does not mean to enter into an unnecessary and invidious analysis of the two lines. He deems it however, under the circumstances stated, due to the canal commissioners and to himself, as well as to the great interests which rest on the execution of the proposed improvement, in the most judicious manner to compare them in those respects in which they most widely differ, and to present in as brief a manner as possible, some views which appear to him decisive on the subject.

The line traced by Col. Long appears to be the result of "a course of examination and surveys, the leading objects of which were to obviate the necessity of constructing a tunnel at the summit till such time as the exigencies of the trade upon the road should require it: to avoid the adoption of inclined planes, having inclinations greater than five degrees, and if possible to limit their inclinations to three degrees; to provide for a route upon which not only *stationary* but *progressive* power might operate to advantage, according to circumstances; to effect a definite location of a route upon ground most favourable for the construction of a road in regard to the principles as well as to the cost of construction," &c.

The results of the course of examinations and surveys of Col. Long are, that the necessity of a tunnel at the summit is obviated by encountering that very summit which the tunnel was recommended to avoid, with the exception of "a deep cut about 1500 feet long, the greatest depth of which will be eighteen feet." In avoiding the adoption of inclined planes, having inclinations greater than five degrees, and in limiting their inclination to three degrees, eleven inclined planes (the whole number required) have been located, *not one of which is straight*, and several of which present in the opinion of the undersigned curvatures altogether inadmissable. In his report of November 1829, the undersigned had observed that "the bold outlines of the country did not admit of prescribing to it too many conditions." He will endeavor to shew that the condition of having inclined planes in no case exceeding five degrees, and in most cases under three degrees, which would lead in every case to the substitution of curved planes for the straight planes located by him in 1829, is an unnecessary and inapplicable one, and that such a substitution would be in every way prejudicial to the contemplated improvement. It will be proper, however, to examine the features in which the two lines most widely differ, in the order in which they have been presented, and

First, as to the tunnel.

In the investigation of this subject and of every other connected with the Allegheny portage, it seems to the undersigned very clear that we can arrive at no conclu-

* See Register, volume 5th, pages 97 and 116.

sion which has not reference to the amount and character of the trade to be accommodated on it, or which is not based upon a "consideration of what the exigencies of the trade" may require. If it is doubtful whether the trade in question may be a very small trade or a very large trade, and we must wait for experience to guide us, then it seems to him the engineers have hazarded a great deal in recommending a rail road instead of a Macademized road, because it is evident that the latter would be justified by a trade much smaller than would be required to make the former a judicious scheme. But if on the other hand, the trade on the rail road will almost as soon as the work is brought into successful operation be very great, if it will at all approach what has been anticipated by the gentlemen of this state who have given most attention to the subject of its improvements, then it seems equally clear that an increased expenditure ought not in the first instance to be spared, which is to diminish forever afterwards *in a much greater ratio than the interest on that expenditure*, the annual charges on transportation.

If any inference is deducible from premises, if any conclusion can be predicated on circumstances, analogies, or probabilities, it would seem to be safe to predict, that a line of rail road would have nearly as large an amount of trade as it could accommodate, which is to unite all the lines of inland communication executed or projected in Pennsylvania, east of the Allegheny mountain with all those west of it, which must form a link in any combination embracing an eastern and western rail-road or canal; which is to connect Philadelphia with Pittsburg, and the great Mississippi valley and our inland lakes with the ocean. If it should not, that it could result only from mistakes in plan or execution, or a misjudged economy in not executing the work on which so many other lines must depend for their usefulness in a manner commensurate with the purposes it was intended to subserve. The following considerations (presuming this view of the business to be accommodated on the proposed rail-road, to be correct,) appear to the undersigned conclusive in favor of a tunnel.

1st. All the examinations which have been so far made, shew a tunnel to be *necessary* to the location of *straight* inclined planes immediately east and west of the summit. A reference to the map presented by the undersigned in 1829, will illustrate this position, which it is presumed will not be disputed, and a consideration of the great importance of the object in view is reserved to a later period in this report.

2d. In depressing the summit level by a tunnel, we place it below an extensive coal field, more conveniently situated *in this case* than any other for the supply of bituminous coal to the towns and villages on the Juniata. In the event of such a work being executed, it is confidently believed that a coal trade sufficient to give a full preponderance to the trade going east and to lift up that going west, will be *created*, and that steam engines east of the summit may be altogether dispensed with. On the plan of Col. Long, (unless a much more expensive power, that of horses, is substituted,) six steam engines would be required east of the summit in addition to those wanted west of it.

3d. The elevation surmounted on the Allegheny mountain, even after reducing the summit by a tunnel, is one-fourth greater than has yet been encountered on any similar improvement, and the difficulty of accommodating a large trade on a rail road of lifts and levels, (superior as such an improvement certainly is to any other plan of overcoming elevations,) increases evidently in a much greater ratio than in proportion to the elevation surmounted. Ordinary considerations of prudence would seem under these circumstances to dictate to us, when going beyond what has yet been effected, at least not to go farther than may be necessary to our purpose.

4th. In discarding a tunnel, we are increasing the distance between Philadelphia and Pittsburg, or increasing the length of the rail-road, so far as time and power are elements in estimating it, about *five miles*, and its disadvantages, if not to an equal at least to a considerable extent.

The above remark is founded on the presumption, that friction on a level line of rail-road may be estimated at 1 in 200; of course, that 26 feet and 4-10ths of elevation would require the same power to overcome it, as an increase of one mile in distance; or that 131 feet of elevation, the additional height of the summit on the portage (should a deep cut be substituted for a tunnel), would be equivalent to an increase of distance of five miles.

It is true that the disadvantages of a summit, or of increased elevation on a rail-road, are not increased in a ratio correspondent with the increase of power necessary to overcome it, because stationary power which will generally be resorted to at summits, will be found in most cases cheaper than locomotives or horses, the most expedient and appropriate powers on levels; yet the cost of rope and wear and tear of machinery, will be found in all cases to constitute very large deductions from any superior economy in power, and under certain circumstances may be equivalent to them.

The undersigned trusts enough has been said to satisfy the board, that in recommending a reduction of the Allegheny summit by tunnelling, he submitted to them no hastily conceived or ill considered project. He has deemed it due to the board and to himself whatever may be the fate of the measure recommended by him, to shew that it is professionally correct. The board are too well acquainted with the duties and responsibilities of a civil engineer, to expect or desire that their officers in forming their plans should look to their plausibility or popularity. They will expect of them to recommend such as they believe to be most eligible, and to leave the proper authority to adopt or reject.

The undersigned will add that he was very well aware, in submitting in 1829 to the Board of Canal Commissioners a plan of crosssing the Allegheny mountain by means of a system of inclined planes and stationary power, and of reducing the summit by a tunnel, that such a plan must necessarily experience distrust and opposition. It would have been singular indeed if it had not. The system recommended was new in all its features in Pennsylvania, and the first essays in the way of tunnelling in this State, had from a want of experience on the part of the undertakers, and from other causes, been unnecessarily expensive. Whilst therefore the undersigned experiences some regret he is not surprised, that he could not present his views to the board in a light as forcible as he would have wished. Since the date of his report much has occurred to familiarize the public with the subject of rail roads generally, and the complete success of the Carbondale rail road has enabled the board of canal commissioners to point to an improvement which illustrates more forcibly than any reasoning could, the advantages of the system proposed for the Allegheny mountain. The superiority of such a system, whatever may have been thought of it twelve months since, it is presumed is no longer questioned.—However bold the assertion may be deemed, the undersigned entertains no doubt that five years hence, when the serious disadvantages of unnecessary elevation, of an unnessary multiplication of engines, and of curvatures in inclined planes on rail roads, are better understood than they appear at present to be, the expediency of tunnelling at the portage summit will be questioned as little.

It now becomes the duty of the undersigned to show that on the principles of Col. Long, as exposed in a published document on a former occasion, the expediency of tunnelling at the Allegheny summit is recommended by the consideration of *reduction in elevation alone.* The undersigned is far from concurring in all the views taken in the document referred to. But they will probably be deemed good authority as regards Colonel Long

himself, when in the present instance that gentleman questions the expediency of a tunnel.

The undersigned here takes leave to refer to a report of the board of engineers of the Baltimore and Ohio Rail Road Company, made on the 20th of May, 1829, signed by S. H. Long, president of the board.

In that document the object of which is to present the result of enquiries made by the board of engineers, "in reference to the selection of a route for the rail road from Parr's Spring Ridge to the point of Rocks," the following views are taken:

"In accordance with an opinion advanced by this board on a former occasion, in reference to the inclination required for the spontaneous descent of carriages upon a rail-road constructed in the manner contemplated for the Baltimore and Ohio Rail Road, the cost of transportation upward, on an ascent of thirty feet, perpendicular height, whatever may be the distance, or in other words, the amount of power required to ascend an elevation of thirty feet, in addition to that required on a level rail-road of the same extent, would at least be equivalent to that required for conveyance through a distance of one mile. Subsequent experiments on the Baltimore and Ohio rail-road, have contributed not only to establish the correctness of the opinion, but also to afford unequivocal testimony that an elevation considerably less than that just mentioned is to be regarded as an impediment more difficult to be overcome than the distance of a mile on a horizontal road. Nevertheless we shall, on the present occasion, adhere to our former mode of estimating the disadvantages attendant upon ascents, and regard an elevation of thirty feet as equivalent to one mile, so far as it relates to the cost of transportation. Agreeably to this assumption, the following table," &c.

It will be unnecessary to give at length the tables which follow. Among the conclusions deduced is this, that on the tonnage anticipated for the Baltimore and Ohio rail road, the annual difference in the the cost of transportation corresponding to a difference in equated distances of eight miles and eleven hundred and sixty-five yards, will be *seventy seven thousand and nine hundred and fifty dollars.*

The above views are submitted without comment.—The trade on the Allegheny portage may certainly without hazard of overrating it, be expected to be equal to that on the Baltimore and Ohio rail-road; and supposing the conclusions of Col. Long to have been even approximately correct, it would be most misjudged economy to dispense with a tunnel, were no expensive substitutes in question, and even if its whole cost could be saved.

The undersigned would now leave the subject of the tunnel, but opinions so exaggerated of its cost and difficulty have been entertained, and so generally, that he is induced to trespass on the indulgence of the board, with a few very simple comparisons. If they produce in the present instance no practical result, they may perhaps be useful in inducing a juster appreciation of similar undertakings hereafter.

The whole estimated cost of the Allegheny portage tunnel, was $165,571 20. This amount like all the items of his estimate, was deemed liberal at the time, but the completion of the Liverpool tunnel, a work of much greater magnitude and difficulty for a smaller sum, shews it to have been much more than ample.

The height of the Liverpool tunnel is 16 feet, its breadth 22 feet, and its length 2200 yards.

Its excavation of course must have been 39½ yards, per lineal yard, and the whole cubic content 86,044 yards.

The whole amount of excavation of the proposed Allegheny portage tunnel is 50,688 yards.

The cost of the Liverpool tunnel, exclusive of compensation to individuals for houses destroyed, and other damages, was £34,770 sterling, or estimating the dollars at 4*s.* 6*d.* $154,533.

And the Allegheny portage tunnel, estimated at a proportionate rate would be $91,034.

In speaking of the Liverpool tunnel Mr. Booth the treasurer of the company, observes, "But while some portions of the tunnel were excavated under circumstances of no little difficulty and danger, and requiring all the skill and energy of the engineer to accomplish, other portions were hewn through a fine red sandstone, clean dry and substantial, and requiring neither props or artificial arching; the natural rock forming the roof of the excavation."

It was deemed by the undersigned proper, on account of the horizontal stratification of the Allegheny, to include in his estimate the expense of arching the whole length of the tunnel; but it is needless to say to any one, conversant with the geology of the Allegheny, that a tunnel there would be excavated through a sandstone as clean, dry and substantial, as any similar rock, and the excavation of which would of course be as favourable, as that of the most favourable portion of the tunnel at Liverpool.

The undersigned will now request the attention of the board of canal commissioners, to the second point in which the lines traced by himself in 1829, and by Lt. Col. Long, during the past season, most materially differ, viz: the character of the inclined planes, traced on them. A mistake on this head will certainly be deemed far more serious than one in relation to the tunnel.—If the tunnel should for the present be dispensed with, it may when found necessary at a later period be executed, and the best arrangement be then adopted, in relation to the planes immediately east and west of the summit; but a mistake in the location of the planes generally on the line, as it would influence the level and graduation of intermediate portions of it, might be deemed one of irreparable evil. The undersigned begs leave therefore, to go into this subject at some length, and to introduce the following extract, from his report of 1829:

"Two points have been deemed to be of essential importance in the location of inclined planes. 1st. That they should be straight, and that the line of the rail-road should for a short distance, from the head and foot of each plane, be in the same direction with the plane; and 2ndly, that the plane itself should either have an uniform inclination with the horizon, or an inclination gradually diminishing between the head and foot of the plane. On a plane any extent curved in its *plan*, a greater loss of power, and wear, and tear of cable or rope, will always be sustained than on a straight plane, and without a stage of some extent at the head of the plane, in the same direction with the plane, a very extensive business cannot be accommodated; and should the plane be so far curved as to prevent the manager at the head of the plane, from embracing its whole extent under his view, the operation of raising and lowering trains must be conducted by signals, and often disadvantageously."

"On planes on which power is to be applied, an inclination slightly diminishing towards the foot of the plane is most desirable; on self-actiag planes, (where the fullest useful effect of the gravity of descending bodies is desired,) the most advisable profile is an approximation to the cycloid. It is in either case a disadvantageous feature, if the plane becomes steeper towards its foot. In the one case the engine at the commencement of its labor, is compelled to exert a greater force than is afterwards required. In the other, a descending train of wagons, may acquire in consequence of its increased stress combined with its accelerating force, a momentum not to be controlled by a brake, and attended with much hazard."

"It was farther an object in the case under consideration, to reduce the number of planes as far as practicable. Such a reduction was peculiarly recommended by the saving of time in transportation which it insured, and the superior simplicity of any system of

transportation which might be adopted on the completion of the work."

Agreeably to the above views, nine out of ten planes were located, varying in their inclination from 3½ to 9½ degress; and in one case, in order to command the whole water power of the Conemaugh, at a point midway the plane, an ascent of 26 degrees was admitted. In one of the planes only, was any curvature allowed in the plane, and in that case the extent of the curvature was an arc corresponding to a versed sine of forty feet on a chord of six hundred and seventy-two feet. All these planes, it will be observed, have an acclivity greater than three degrees, the limit which Col. Long deems most desirable. It will be proper, therefore, to ascertain whether any very strong considerations forbid such an increase of inclination.

It will perhaps on the first view, strike a superficial thinker, that the power of the engine required for a plane, must be increased in some degree in proportion to its acclivity. It will be perceived however at once, by a mind ever so little versed in the simplest elements of mechanics or machinery, that this is not the case; that to lift a weight a given height in a given time, the principle of the inclined plane requires an equal expenditure of power, whether, it be steep or gentle; and in *practice* something more on a gentle plane, because the same amount of power must in each case be expended in overcoming the *gravity* of the load, while its *friction* on a gentle plane is of course in the ratio of its increased length. It will equally present itself that in increasing the acclivity of a plane, the *whole weight* of rope will not be increased, because presuming the plane to be twice as steep, and the *stress* on the rope of course to be doubled, the rope will on the other hand be but half as long, and the strength of rope, it is well known, increases in proportion to its cross section, or *to its weight in a given distance.*

It will be equally apparent on examination, that the whole weight of the drum or rope roll, and of the sheeves of the plane, will not at any rate be *increased* by an increase of acclivity.

If the theory of the inclined plane furnishes nothing to justify the limit of acclivity assumed by Lt. Col. Long, neither does the practice of British engineers.—It is true that in *England proper*, one of the most champaign countries of Europe, the inclined planes of railroads are generally of but slight inclination. The elevations to be surmounted in that country are not often considerable, and it would in most cases have been difficult to have thrown a large amount of rise or fall into a small distance. Self-acting planes have been made gentle for an additional reason; because, as observes Mr. Wood in his treatise on rail roads, "Where gravity is the moving power, it scarcely need be stated, that the strictest regard should be paid to economizing its effects. The power itself is acquired at no cost, and on that account should be extended to the utmost limit of its applicability."

But in that portion of the interior of England, in the neighbourhood of the Peak, which presents an aspect approximating in rudeness and boldness of outline to our own Allegheny, and in the mountains of Wales, the practice of British engineers is very different; and it is believed that the assertion may safely be hazarded, that not a single instance can be cited in those districts, in which under similar circumstances, planes of the gentle inclination proposed by Lt. Col. Long have ever been executed or proposed.

No improvement in the world presents so striking an analogy to the proposed Allegheny portage, as the Cromford and High Peak rail-way. It connects two lines of canal, the Peak Forrest and Cromford. Its summit is elevated 992 feet above the surface water of the latter, and the country over which it passes, presents obstacles of a similar character. It seems to furnish us then a case in point, where the practice of those who have preceded us may lend us some aid. It may be added, that the work presents as a study the farther recommendation that it has been but lately executed, and of course those who projected and executed it, have had the advantage of all the recent improvements in rail roads, and that it was planned and executed by Mr. Jessup, one of the most distinguished, among the many eminent civil engineers of Great Britain.

In the London Year Book, for the year 1830, the following statement is given of the inclined planes on that work:

1st ascent	1740	feet long	204	feet	1–8.53 rise.
2nd "	2133	"	261	"	1–8.17 "
3rd "	2124	"	253	"	1–8.40 "
4th "	1371	"	98	"	1–14 "
5th "	2550	"	168	"	1–15.2 "
6th descent	1980	"	266	"	1–7.44 "
6th "	1365	"	191	"	1–7.15 "

It will be seen on examining the above inclinations that they vary between 3¾ and 8 degrees in surmounting a summit of 992 feet, and that the elevations overcome by the inclined planes vary between 98 and 266 feet; evidently shewing that the inclination as well as the extent of the planes was deemed a matter of no particular moment, and was governed by localities; and that the peculiar advantages of a plane not exceeding three degrees of inclination, were in a case similar to that under consideration, not perceived by Mr. Jessup.

In Wales the undersigned scarcely recollects an inclined plane where under 10 degrees, and those that he saw in the mining districts of that province varied generally between 10 and 30 degrees; and he is informed by Captain M'Neil that he saw one on the Blaencum rail road near Abergavenny as steep as 35 degrees.

It is scarcely worth while to add any thing farther on this subject. It will be seen on reference to the profiles submitted in 1829, that the range of inclination proposed by the undersigned on the Allegheny portage with one exception, does not vary materially from that adopted by Mr. Jessup on the Cromford and High Peak rail way, and that in the case in question, an important object, that of securing a water power equal to the accomodation of any trade which can ever be anticipated on the portage, seems to recommend an increase of the angle of inclination of the plane. It will be agreed that this particular plane is *inconveniently* steep, and that but for the circumstance above stated, a different location would have been deemed more advisable; but it seems also equally clear that where a great elevation is to be surmounted, planes even if straight, may be inconveniently gentle, because they ought not to be more numerous than necessary, and in the language of Mr. Sylvester, "the length of an inclined plane ought never to be such as will prevent a person from seeing the whole course of it from top to bottom."

The undersigned will now proceed to examine the character of the planes proposed by Col. Long, as substitutes for those to which attention has been drawn above, and he will premise, that however objectionable he thinks he can shew them to be, he deems their defects as necessarily resulting from the inapplicability of the system and principles on which they were traced. In a rugged country, like that over which the proposed connexion is contemplated, inclined planes must be located on the slopes and spurs of mountains often intersected with wide and deep ravines. It under these circumstances, may be deemed next to impossible, to trace a line descending at any given inclination, for a very considerable distance, without changing its direction, and therefore planes of gentle inclination must necessarily be *either more numerous than would be advisable, or curved.* Satisfied from his knowledge of the country that the principles adopted, and limits of inclination preferred by Lt. Col. Long would necessarily lead to this dilemma; and believing that an unnecessary multiplication of planes or curved planes were evils equally to be deprecated on a line of rail road as important as the one contemplated, the undersigned was in-

duced to test the correctness of his views, by a comparison with those of two other gentlemen distinguished for scientific and practical attainments in the profession.—The engineers alluded to were Mr. John B. Jervis, engineer of the Carbondale, and Albany and Schenectady rail roads, and Horatio Allen, Esq. engineer of the Charleston and Hamburg rail road, who it will be recollected was deputed to England by the Hudson and Delaware Coal Company to obtain information in relation to rail roads, and fixed and locomotive machinery generally. The following are extracts from the letters of these gentlemen in reply to his inquiries:

Mr. Jervis observes, speaking of the Carbondale rail road,—"our inclined planes are all straight. I should deem it a great objection to have such a curve as would prevent the men from seeing the operation from end to end. A moderate curve may be admitted, but I should want a strong inducement to admit any essential curving on a plane that had heavy work to perform. I should vary the inclination very much before I would curve for a road that had extensive business, or incur more expense in construction."

Mr. Allen in a letter of the 22d of January says: "I would decidedly prefer increasing the acclivity very considerably before I should admit a change of direction in the plane, and when following this principle would lend to extreme cases of ascent, I think I should increase the *number* of planes rather than introduce curvatures. The sources of derangement and accident are sufficiently numerous in inclined planes, without adding those which are inseparable from curves."

The annexed volume marked P. exhibits protractions of the planes traced by Col. Long, and proposed by him as substitutes for the straight planes which have been the subject of examination. The undersigned confesses, that he feels some reluctance at going into an argument, to prove the injudiciousness of adopting such planes on such a work as the Allegheny portage. He has no hesitation in saying, that on those of them which present the largest amount of curved line, an endless rope or chain, (the machinery which except under particular circumstances should be preferred on a plane of uniform inclination,) if it could be worked at all, would be cut to pieces almost immediately, and he thinks it would not be difficult to shew that the waste of power and wear and tear of machinery, on any plan of working which might be proposed, would be immensely increased.

Col. Long has not, however, submitted to the board of canal commissioners his views as to the manner of transportation on the proposed rail-road, and his estimate it will be observed embraces no item for machinery of any kind. The undersigned is, therefore, without a fact to indicate to him the plan of working which Col. Long proposes for his planes. Under these circumstances he begs leave to submit the following views in illustration of the position he has taken, the force of which he thinks will be appreciated by the board, and admitted by scientific individuals who may chance to peruse them.

The plan of applying stationary power on planes, which is attended with the least friction of rope, is that which purposes attaching the load to the end of the rope, on the reciprocating system. Such a plan of working would be in general unadvisable on planes having an uniform angle of ascent, because, as must be obvious the engine has on this plan, not only to raise its load, but the weight of the rope to which it is attached, and which on any plan of endless machinery would be counterbalanced by the extension of the rope along the opposite descending track. The increased friction of ropes by curves will however be considered on the plan first suggested, *because on that plan it is smallest.*

Now on a straight plane of any length or elevation, the friction on the rollers is evidently in proportion to the weight of rope, and on any one roller is as the rope resting on that roller, or as R.

But if the plane be curved, then the stress on each roller is made up not only of the weight of the rope, but of the *resultant of two forces*, viz: the *stress of the load* (including the stress and friction of the portion of rope below the the roller) and *at least an equal force* required to overcome this stress; or supposing:

S—the stress of the load, and rope below any given roller.

D—the distance between the rollers on the plane; and

V—the versed sine of a portion of the arc between any two *alternate* rollers.

Then the pressure on any roller on a curved plane

$$P=R+\frac{2vs}{D}$$

Applying this formula, and selecting from Wood on rail roads as the subject of investigation the plane which approximates most nearly to the standard of limitation (three degrees) preferred by Lt. Col. Long, we have a straight plane 2325 feet long, with a rise of 115 feet, on which a rope 7¼ inches in circumference is made use of to raise seven loaded carriages weighing 9408 lbs. each. The rollers on the plane appear to have been about 20 feet apart.

Now the pressure on each roller of the above plane or the quantity R. of the above formula would be simply the weight of 20 pounds of 2¼ inch rope or about 18 pounds.

Let us suppose a plane precisely similar to the above except that it should be curved in arcs of 600 feet radius. Presuming the load to be precisely what it is stated in Wood.

The stress on the rope, comprising both the gravity and friction of the load, and estimating this last at 1 in 100, in consequence of the curvature of the plane, would be at a point near its foot $=\frac{9408\times 7\times 115}{2325}+\frac{9408\times 7}{150}$ or 3697 pounds; and the versed sine of 40 feet in length of an arc of 600 feet radius is 33.100ths of a foot. Then substituting the symbols in the above formula, we should have for the stress on a roller at the foot of the plane $18\frac{\frac{1}{1}\ 3697\times.33\times 2}{20}=18+121=139$ lbs. Consequently, the ratio of pressure, or of friction, on the friction rollers or sheeves of the above planes near the foot of the planes, is as 18 to 139, or as 1 to 7 7.10ths.

But it is evident that the pressure on each roller, commencing at the foot and advancing to the head of a plane, between the foot and head of a curved plane, increases rapidly, because we have to add both *the stress and friction of rope* below each roller, to the stress and friction of the load, in ascertaining (the resultant which gives us) the pressure on the roller; and it is to be recollected, that in estimating this stress and friction, we are to estimate for a rope of larger dimensions than would be required on a straight plane, as well on account of the increased strain of the rope, as its increased wear and tear. It is not then hazarding too much to say, that the increased pressure in cases above supposed, would be *at least ten fold* on the curved plane.

Now the friction of rope on the sheeves of a plane is of course proportionable to the pressure, and whilst no rule can be laid down for determining the ratio of the wear and tear of rope, to the friction on the sheeves, (because a part of this wear and tear is experienced at the rope rolls, and results also from the rigidity of cordage and strain of the load,) we know that it depends very materially on it. The following considerations, show that we ought to be very wary of increasing, (as we should in a formidable ratio, by curvatures in inclined planes,) a charge on transportation under any circumstances considerable.

On the Liverpool and Manchester rail road, Mr. Booth in his late pamphlet on that rail road observes, that, "the curves seldom exceed a deviation from a straight line of more than 4 inches in 22 yards; forming a segment of a circle, which if extended would embrace a circumference of 15 miles," Nevertheless in an

estimate of the annual cost of transportation on that road by stationary power, made by Messrs. Walker and Rasstrick, in 1829, the annual wear and tear of ropes on the road way, is estimated by the former gentleman, at upwards of £11,000 sterling, or one third of the whole expense of transportation: whilst by the last named engineer, the whole cost of transportation was estimated at £33,317, and the wear and tear of ropes alone at £14,820, a sum nearly equal to five-sixths of all other charges on transportation.

On the Rainhill and Sutton inclined planes, the annual expense of ropes alone was estimated by Mr. Walker, at £3315, or *at twice the amount of all other charges on transportation* on those planes.

In our own country, the wear and tear of rope, has been found by Mr. Josiah White, on a straight plane to be equal to one and one fifth cents per ton, in *descending* 215 feet.

To these statements the undersigned begs leave to add the following extract, from the report of a deputation of the engineers of the Liverpool and Manchester rail road, appointed to visit the rail roads in the North of England, made at Liverpool, October 22, 1828.

"From New Castle, the deputation went to Sunderland, and visited that end of the Hetton rail way, which terminates at the shipping place on the river Wear. The quantity of coal brought along this rail way, was stated to be from 12 to 1500 tons. The rope was considerably thicker than on Mr. Thompson's rail way, and was stated by one of the engineers to be worn out in 4 or 5 months. The plane next the shipping place is 1968 yards long; worked by a forty horse engine.—The curves near the port are very abrupt, and *must necessarily very much increase the wear and tear of the rope on that part of the line.*"

It is believed to be unnecessary to expose further, the serious evils which would arise on an important line of rail road, from curvatures in inclined planes, to the extent proposed by Lt. Col. Long.

It will be observed that the undersigned, has so far avoided any investigation of the details of the line submitted by Col. Long. He is willing to presume if the outlines of his plan of improvement are judicious, its details are so likewise. One of the suggestions of Col. Long, in particular, the undersigned has certainly no objection to. This is the introduction of a tunnel, at one of the bends of the Conemaugh, by which the length of a line along the valley of that stream, may be reduced something more than a mile. He will unite with pleasure with Col. Long, in submitting this suggestion to the careful consideration of the engineer, who may execute the work, believing the object in view ought certainly to be attained, if the changes in the line necessary to effect it, would not in other respects impair it, and if it can be effected without introducing a curved plane, which on the line traced by Col. Long appears to result from it.

Presuming the Conemaugh tunnel proposed by Col. Long to be incorporated into his plan, the length of the line proposed by the undersigned would be about thirty seven miles, instead of thirty eight-miles and fifty-three poles, as stated in his report of 1829. It will be observed by the canal commissioners, that the line of Lt. Col. Long, is stated at but about 35 and five-sixths miles. The causes of this *apparent* difference between the two lines, (for as they cross at the same summit, and are traced along the same valleys, and often alongside of each other, it is obvious it can only be apparent,) the board will at once know how to account for, by recollecting:

1st. That the length of the line traced by the undersigned in 1829, is computed to the head of the basin at Hollidaysburg; whereas that of Col. Long is terminated at the Hollidaysburg bridge, a point about three-eighths of a mile short of the basin.

2dly. The line of Col. Long has been traced in regular curves and tangents, an operation which always results in a reduction of distance, but which as it is a work merely of routine, and one of labour and expense, the undersigned is not in the habit of performing, until a line is definitely determined on, and a work about to be executed.

The undersigned ought not to close this report without adverting to the difference in the estimates of Col. Long and himself. The whole cost of the line surveyed by that gentleman it appears is but $611.700, whilst that of the undersigned, including the tunnel at the summit, is $936,000. The commissioners will not fail to remark that Col. Long, has made no estimate for steam engines or machinery of any kind; that nothing is included in his estimates for superintendence or contingencies; that they extend only to a point near the Hollidaysburg bridge; and that they do not include the lengths of rail road which *must* be made, parallel to each basin. Passing by these points, to which the undersigned respectfully requests the attention of the board, he begs leave to submit the following remarks with regard to the aggregate allowed by Col. Long, for road way formation.

This item of expense, as the board well know, may be more or less; and it is among the most delicate of the duties of an engineer, and the one which requires the exercise of his best judgment, in contemplating an expenditure for this purpose, to have constantly in view the objects to be effected by an improvement. If the trade on a rail road is to be a small one, it is evidently injudicious to expend too large an amount for a more perfect accommodation of it. If it is to be a large trade, then sound economy will dictate such an expenditure in preparing the road bed, as will give to the power employed on the rail road its fullest useful effect, and reduce of course in the largest practicable proportion the expenses of transportation.

Believing as the undersigned did, that the Allegheny portage rail road, would if properly executed, have a larger trade than any similar work in this country, he did not in choosing a line select that which would be most easily formed into the road bed of a rail road, but that which seemed to him to possess the greatest *capabilities*, or on which a rail road when executed would be most valuable. He felt that a very small reduction on the charges of transportation would be more than equivalent to the interest of a large additional expenditure in first cost, and that it would be most injudicious economy for the sake of even a considerable saving in the preparation of the road bed, to tax forever afterwards the trade on the road unnecessarily. He confesses he should have deemed it as a great mistake to have feared a liberal expenditure where the object to be effected by it was so important, as to incur an extravagant one on a rail road destined for the accommodation of a small traffic.

The whole cost of road way formation for the Allegheny portage rail road according to the line and estimate of Lt. Col. Long, will it appears be "one hundred and eighty-two thousand one hundred and seven dollars and eighty cents, which gives for the average expense per mile inclusive of a tunnel, one thousand feet long, five thousand and eighty six dollars fifty-nine cents."

The undersigned would respectfully submit a single fact to the board.

He is executing in the anthracite district of this state, a rail road along the valley of a stream, (the Little Schuylkill) highly favorable to a work of the best description. As the object of the improvement was a special one, (the accommodation of a coal trade,) it will be conceived, that though it was deemed advisable to execute the work in a substantial manner, no unnecessary expenditure would be incurred on it. The cost of the road way of this rail road (20½ miles) executed under uncommonly favourable circumstances *exclusive of the wood work of bridges* will be about one hundred and five thousand dollars, or a larger average per mile, than

is allowed by Col. Long for the road way formation of a rail road *including bridges* which is to cross the Allegheny mountain.

The undersigned would remark in closing this report, that in accepting the appointment which the board did him the honor to confer on him, he felt scarcely disposed to believe that any facts or views which might be developed on farther examination, would induce a change of the opinions expressed in his report of the 21st of November, 1829. He should indeed have performed his duty to the board but indifferently, and should have deserved very little their confidence had his plans been formed on such slight data; as to induce a belief that they would be materially changed, on further examinations of himself or of others. He was happy, however to meet the wishes of the board, and to have an opportunity of considering any suggestions on the part of the gentlemen with whom he was associated, ane he has no doubt the canal commissioners will do him the justice to believe that if any other plan for crossing the Allegheny, had on reflection appeared to him preferable to that submitted by him in 1829, he would have had the candor to acknowledge it.

He regrets that the opinions of Lt. Col. Long and himself differ so widely. That gentleman has however believed it his duty, to offer as a substitute for the line surveyed in 1829, one the merits of which the undersigned has certainly not perceived. He has had under these circumstances no alternative but to present the above investigation. This duty to the board and to himself being performed, the undersigned now takes leave of the subject.

All which is respectfully submitted,

MONCURE ROBINSON, *Civil Engineer.*

Philadelphia, March 5, 1831.

For the Register of Pennsylvania.

THE ALCHEMIST.

No. XI.

Unerring truths, O man! my lips relate:
This is thy life to come; and this is fate. *Odyssey.*

The following communication is of a character so entirely out of my usual line, that I shall not immediately reply to the inquiries it contains, but will at once allow my correspondent to speak for himself.

TO THE ALCHEMIST.

Sir,—I can truly say that the appearance of your essays has given me sincere pleasure; and indeed, this is the case from both public and private considerations. It is at all times desirable to deserve and perpetuate, by renewed efforts, that succession of moral and critical papers which, with intervals of various length, has been continued to the present time, from the period of your illustrious predecessors, the Guardian and the Spectator. In the whirl of business or of politics, the clashing and multiform combinations which arise amid the struggling and contending interests of mankind, but too little attention is commanded by the gentler and more ornamental studies. Of our country it may in general be most truly said, that "musas colimus severiores." We have, or fancy we have but little leisure to devote to mere elegant literature, while engrossed with the more important and animating tasks of augmenting productive capital, or dismissing one President from his temporary throne to make room for another. In the field of science, too, both at home and abroad, an analogous change has taken place. The Parnassian Nine have given way to the "Ologies;" and those talents and that taste which might have served to improve our habits of thinking and speaking, are now much devoted to the selection of fossil specimens possessed of finely marked "external characters," to the careful enumeration of the pen feathers in the wing of some strange fowl, or to an accurate description of the bristles which ornament his nostrils. The trophies of our young men of genius are no longer to be sought for in the world of letters; they moulder in the black relics of a mastodon, seem to chirp in a beautifully stuffed bird, frown tremendous in the huge skeleton of a rhinoceros, or grin and exhibit attitudes in a finely preserved orang outang. And even when general literature receives their attention, in order to render it interesting, it is frequently found to require the piquancy of a foreign or an ancient language; and there are probably those among us who spend less time among the orators, historians and poets of their own and kindred nations, than in studying, with the assistance of Champollion, the dialect of primeval Egypt.

I need, not, Mr. Alchemist, in order to defend the views with which I commenced, enter into the consideration of the question, what are the reasonable wants of the existing age, or the comparative merits of literature, ethics and the art of thinking, on the one hand, and of natural science, on the other. It will be readily admitted that *some* attention ought at all times to be bestowed upon the studies first enumerated; studies in fact which mainly constitute the difference between the civilized man and the savage. It only remains for me to acknowledge, that while I have thus been aware of the duty, I have neglected its performance. In default, however, of the application of a just share of time to the objects alluded to, the best substitute was perhaps the selection of a science which had a strong and intimate relation to them all. Giving way to the torrent of custom, which now directs the energies of our minds to the objects presented by nature, the choice still remains to study, physiologically and anatomically, the phenomena of the human understanding itself. In short, Mr. Alchemist, I have become—how shall I acknowledge it? I have addicted myself, for some time—to a science—to a study which—an inquiry—a—in short, Sir, I am a *phrenologist.*

At the perusal of this startling word, I fancy I can see the look of astonishment, not unmixed with contempt, with which you lean farther back in your chair, and proceed, with a more careless gaze, to glance over the remainder of my epistle. Why yes! Mr. Alchemist! of this absurdity I have been guilty. Impressed, from early boyhood, with a strong prejudice in favour of a man's brains having some connection with his wits, and finding a large portion of mankind firmly persuaded of the truth of physiognomy, I saw no reason, a priori, to doubt the possibility of associating certain mental qualities with corresponding peculiarities in the form of the head. I read Lavater, and there found the most ardent and positive declamations in favour of the characters to be discovered in a nose or a chin; and as the fact appeared undeniable that the cranium really contained the brain, I could not possibly devise a reason why indications of at least equal force could not be obtained from this more noble quarter, or why the shape

of the cerebral organ should not have at least as close a connection with the faculties and operations of the mind as that of the bones and cartilages of the nose or of the lower jaw. To this strange opinion of mine I can draw sundry supports, with which I shall not now detain you; beginning with the legend of Minerva springing from the head of Jupiter, and terminating with the popular use of "intellect" and "brains" as convertible terms. But waiving all efforts at the defence of phrenology, which has occupied so many and such ponderous tomes, and passing by all remonstrance against the unwonted vehemence with which the poor science has been attacked in the most diversified channels, the thunders of pulpit denunciation, the ridicule of the theatre, the innuendo and picked anecdotes of the daily gazette, the vulgarity of Blackwood's Magazine, the passionate invective of the rival lecturer in anatomy, and the sharp witted spleen of the rival lawyer, as they respectively vent themselves in the Edinburgh Review, if the inquirer after natural facts is willing to overlook all these, and apply himself to the unbiassed investigation of the real truth, still, even here, a new set of troubles and difficulties await him. These, in fact, are the main cause of my addressing you the present letter; the object of which is to solicit your advice in such a perilous case. If you think me slow in approaching the point, my excuse must be the portentous nature of the acknowledgment which I have thus been compelled to make. I here allude to the judgments which men form of phrenology from the indications which they find or fancy it presents in regard to their own characters.—Were I not, sir, in such a desperate taking, this might perhaps furnish some amusement; but, as it is, I really think it too hard to be obliged to furnish elevated characters for every body—to stand responsible as general endorser for the deficiencies of destiny, who, all sanguine expectations to the contrary notwithstanding, still most obstinately persists in maintaining the rule that not more than one person at one time shall ever possibly be first. How can every person expect to be superior in talents and virtues, when by the very terms of the case, the elevation being common to every body, ceases to confer a superiority? Such gentlemen seem to have forgot that there must *somewhere* be found a commonalty of nature, a numerous mass of individuals, all very respectable and honourable, but who, from the mere fact of their numbers, cannot possibly be any thing extraordinary. The very idea of a common or average skull, of course, depends upon its being like other people; and every body cannot possibly be very unlike any body else. Yet still, when they consult the poor phrenologist, most men seem to have a particular horror of exhibiting ordinary or common place capacities; and most would, I believe, be willing to compound for a few of the less important vices, might they only be indulged with the possession of some strong and intense feeling, or vast reach of intellect, which may distinguish them from others, and cause all the collateral defects to be viewed as unavoidable concomitants, the mere eccentricities of genius. But, dear Mr. Alchemist, what is the situation of the unlucky referee when he has none of these consolatory appearances to disclose?

> Seiz'd and tied down to judge, how wretched I,
> Who can't be silent, and who will not lie!

I will not attempt to deny that occasionally a lucky discovery has been followed by the speedy conversion of an opponent, just as after similar disclosures, when operating the other way, an indifferent inquirer has been changed into a bitter and uncompromising enemy of the craniopotent doctrine. My excellent friend, Pamphlet, who has been, time out of mind, a thorough disciple of the Edinburgh Review, and as such, duly held phrenology in a just contempt and detestation, on a sudden entirely ceased his opposition. I was not altogether without my suspicions as to the cause; and these were confirmed, some six months after by his informing me, very quietly, that Dr. Ganglion had told him, what I knew already, but had not ventured on expressing, that the large rounded protuberances in his forehead indicated strong powers of *causality*. Mr. Maximum, the Benthamite, after being told that the elevation of his forehead indicated good intellectual powers and much benevolence, could bear without particular indignation to be informed of his unusual degree of self esteem; and in fact, probably argued, with much justice, that the owner of such estimable qualities was entitled to entertain a pretty good opinion of himself. The unfortunate Mr. Density, on the other hand, entertained me one day with the remark, that phrenology was a very injurious doctrine, inasmuch as, by the fatality of its decisions, it discouraged and disheartened men from exertion. On looking him in the face, in consequence of this somewhat novel position, I could not avoid seeing that, as regards himself, if he really entertained ambitious views, there was ground for the apprehension. I could not for a long time discover what was the cause of the peculiar and apparently inveterate dislike for the science entertained by Mr. Quilldrive, the industrious correspondent of the Literary Gazette, what could possibly account for the perpetual series of sneers, misstated anecdotes, mischievously selected extracts, parade of unfavourable authorities, and phrases of implied disapprobation with which his columns so incessantly teemed. I knew perfectly well that, though by no means defective in natural endowments generally, it had not been the will of Providence to furnish him with a strong sense of ideal beauty; but it was not till years afterwards that I discovered that this was the point that hit, the learned gentleman having perpetrated rhyme, and that in imitation of the illustrious Addison, he valued the just merits of his prose less than the reputation of having written poetry.

It is time, sir, to close; and I can only add my complaint that with the exercise of all the ingenuity of which I am master, I have been unable to avoid falling into scrapes. All that I can do by careful softening of the more repulsive qualities, by placing the better in a more conspicuous light, by explaining the good constructions of the more fearful points of character, by a thoughtful preparation, and by presenting the different attributes of a head in a judicious order, so as to produce favourable sensations by their arrangement, upon the principle of musical succession or of ocular spectra, I have tried to the utmost; but still I cannot keep out of difficulties. I have concluded, therefore, to beg you, Mr. Alchemist, as a public teacher of morals, to give me your advice in the case; or if unwilling to render me that assistance, at least to request that you will endeavour to impress it upon single gentlemen desirous of having that light upon their future fortunes which phrenology can bestow, that it is altogether unreasonable, and indeed quite out of the question, to expect me to possess such control over the affairs of mankind, as will elevate them all to the standing in public affairs, which belongs to a Washington or a Franklin.

CRANIOSCOPUS.

CENSUS OF BERKS AND BUCKS

NAMES OF *Townships and Boroughs,* IN *BERKS COUNTY.*	WHITE PERSONS. MALES. Under 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90	90 to 100.	FEMALES. Under 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.
Amity,	108	106	104	82	102	93	56	29	15	8	3	0	104	80	86	92	110
Alsace,	175	132	113	95	183	87	82	41	19	10	4	2	195	160	123	109	181
Albany,	93	84	96	69	78	60	53	24	13	3	1	0	98	88	72	63	81
Bethel,	112	125	105	75	100	88	50	38	22	8	3	0	131	117	83	77	131
Borough of Reading,	459	360	348	369	504	268	226	130	70	21	7	1	448	375	333	386	506
Brecknock,	83	61	55	34	77	48	31	20	14	7	0	0	83	44	55	51	68
Caernarvon,	80	57	66	53	77	35	39	25	11	7	1	0	57	54	44	47	80
Cumner,	242	208	183	143	242	137	115	54	28	21	3	1	217	190	182	165	223
Colebrookdale,	127	100	76	66	113	68	44	27	14	4	0	0	103	97	70	65	73
Douglass,	92	60	49	43	69	50	23	16	10	3	1	0	72	59	53	47	62
Earl,	73	93	63	60	71	60	38	21	17	6	0	0	67	65	60	56	62
East District,	50	45	44	31	42	20	26	10	7	5	2	0	52	43	35	32	46
Exeter,	113	108	101	81	142	85	54	35	13	4	2	0	114	105	78	102	119
Greenwich,	132	107	82	80	100	91	54	34	23	6	1	0	144	102	82	83	94
Heidleburg,	394	333	275	198	331	218	128	88	58	17	6	0	352	313	237	238	346
Hereford,	152	130	126	97	140	87	61	38	18	7	3	0	154	128	103	107	134
Longswamp,	157	140	111	88	122	89	72	32	19	9	0	0	168	135	106	96	135
Lower Bern,	197	174	127	129	197	124	66	44	16	5	2	0	213	157	134	122	187
Maidencreek,	119	100	88	86	126	72	47	22	17	5	0	0	102	84	84	83	128
Maxatawney,	190	149	147	120	178	112	71	53	29	12	3	1	174	145	133	126	200
Oley,	120	103	119	96	126	82	55	24	13	8	0	0	114	94	86	93	131
Pike,	71	74	47	37	55	41	22	11	16	4	1	0	59	65	46	46	55
Richmond,	137	115	93	68	121	87	40	28	21	8	1	0	99	177	89	172	125
Robeson,	173	141	126	104	159	112	72	47	19	13	2	0	181	134	126	95	156
Rockland,	139	112	87	59	89	74	44	31	17	5	2	0	126	120	81	61	96
Ruscomb Manor,	125	112	81	63	70	78	42	23	16	11	0	0	118	103	69	48	91
Tulpehocken,	196	185	134	111	212	124	74	46	38	9	1	0	185	167	114	144	218
Union,	88	74	80	68	79	70	42	19	7	3	2	0	76	66	65	60	79
Upper Bern,	220	160	187	107	156	109	88	37	23	11	3	0	177	161	136	110	166
Windsor,	200	186	158	143	188	126	77	50	26	11	2	0	216	186	138	120	186
Upper Tulpehocken,	148	108	103	96	110	83	49	30	19	8	1	0	115	114	104	82	104
	4765	4042	3574	2951	4359	2878	1941	1127	648	259	57	5	4514	3928	3207	3178	4373
BUCKS COUNTY.																	
Bedminster,	124	109	120	96	111	90	67	36	28	17	3	0	133	101	101	74	126
Bensalem,	132	144	105	78	128	100	80	46	31	8	3	1	126	100	102	95	136
Bristol,	78	98	123	91	123	79	66	36	26	8	2	0	106	96	112	114	105
Bristol Borough,	80	80	80	83	125	78	35	22	6	3	1	0	84	78	78	71	99
Buckingham,	189	150	131	115	182	120	76	66	32	13	6	0	157	128	125	113	189
Doylestown,	141	104	131	108	154	106	62	34	31	10	4	0	122	117	116	96	166
Durham,	57	48	46	41	105	106	21	12	8	4	0	0	55	45	39	36	50
Falls,	173	134	144	129	189	133	63	54	29	10	3	0	146	141	164	149	176
Haycock,	79	89	69	49	86	58	48	24	22	7	2	0	90	67	67	45	90
Hilltown,	137	111	126	98	132	90	51	57	33	7	3	0	115	106	112	109	132
Lower Makefield,	102	94	88	66	105	97	44	32	21	9	1	2	85	85	87	75	103
Middletown,	161	127	127	130	189	107	76	40	20	11	1	0	127	110	126	103	174
Millford,	155	143	133	98	149	109	71	55	35	19	3	0	147	136	128	112	166
Morrisville Borough,	32	38	18	26	72	43	12	10	5	0	0	0	46	32	25	24	58
New Britain,	107	99	81	67	96	69	52	25	14	13	1	0	98	79	65	60	106
New Town,	85	93	81	95	109	80	45	24	19	8	3	0	82	75	54	69	115
Northampton,	128	92	105	72	129	100	55	30	26	11	0	0	114	97	75	100	133
Nockamixon,	168	166	107	90	233	153	94	40	26	15	4	0	162	133	129	112	151
Plumpstead,	147	133	112	91	152	99	79	47	41	14	3	0	125	132	110	97	156
Richland,	129	118	123	98	145	90	75	39	28	12	0	0	117	116	107	101	136
Rockhill,	179	153	145	116	157	112	74	43	36	11	3	1	154	126	111	134	171
Solesbury,	207	169	156	136	282	140	91	59	33	13	4	0	171	142	148	148	265
Southampton,	70	77	89	78	115	67	43	27	24	3	0	1	84	68	76	83	112
Springfield,	182	140	144	122	156	111	73	56	32	10	4	1	164	160	131	131	156
Tinicum,	124	118	104	78	195	145	56	34	31	14	3	0	116	96	102	105	123
Upper Makefield,	111	88	87	92	137	93	38	50	29	8	2	0	102	103	72	76	151
Warwick,	92	70	65	57	92	81	42	38	25	15	2	1	81	70	64	41	103
Warminster,	56	46	39	38	60	42	26	17	16	5	5	0	41	41	42	35	65
Warrington,	33	30	31	30	43	33	20	16	12	1	1	0	36	28	33	36	47
Wrightstown,	42	51	39	35	52	38	28	14	15	4	1	0	36	43	35	37	58
	3500	3112	2949	2503	4003	2769	1663	1083	734	283	68	7	3222	2851	2736	2591	3818

COUNTIES.—JUNE 1, 1830.

							FREE COLOURED PERSONS.												SLAVES.				TOTAL.	Included in foregoing.					
							MALES.						FEMALES.						Males, 10-24	Females				Aliens.	Deaf & D		Blind		
30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.	Under 10.	10 to 24.	24 to 36.	36 to 55.	55 to 100.	100, &c.	Under 10.	10 to 24.	24 to 36.	36 to 55.	55 to 100.	100, &c.		10 to 24.	36 to 55.	55 to 100.			Under 14.	14 to 25.	25, &c.	Whites.	Colored.
88	42	31	25	6	0	1	1	1	0	1	0	0	1	1	0	1	1	0	0	0	0	0	1378	0	0	0	0	0	0
100	69	32	19	9	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1943	5	0	0	0	1	0
63	53	20	9	2	2	0	0	0	2	1	0	0	0	0	1	0	0	0	0	0	0	0	1129	1	0	0	0	0	0
81	55	33	28	10	3	0	1	0	2	0	0	0	2	0	2	0	0	0	0	0	0	0	1482	3	0	0	0	0	0
362	203	165	81	28	13	1	31	18	15	20	10	0	44	20	25	9	5	0	0	0	0	0	5859	26	0	0	0	1	0
42	27	27	15	11	2	0	1	2	2	1	1	0	1	1	2	0	0	0	0	0	0	0	866	2	1	0	1	1	0
36	37	24	11	7	1	0	2	1	1	1	0	0	3	2	1	0	1	0	0	0	0	0	861	5	3	2	0	1	0
150	77	61	33	13	5	0	1	4	2	1	0	0	0	1	1	0	2	0	0	0	0	0	2705	7	4	1	2	5	0
76	45	28	16	4	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1219	0	0	0	0	0	0
54	28	12	4	1	0	0	8	8	3	1	2	0	4	1	2	1	0	0	0	0	0	0	838	1	0	0	0	0	0
72	33	25	7	4	0	0	2	4	3	2	1	0	3	5	3	1	2	0	0	0	0	0	979	0	0	0	0	2	0
24	23	10	9	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	562	1	0	0	0	1	0
77	56	33	21	6	0	0	0	0	1	1	1	0	0	1	0	2	0	0	0	0	0	0	1455	1	1	0	0	2	0
79	50	33	23	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1407	0	0	0	0	0	0
230	128	91	50	16	1	0	7	5	7	3	0	0	11	9	5	2	0	0	1	1	0	0	4101	9	0	1	2	0	0
92	55	40	20	17	1	0	1	0	2	1	0	0	0	0	2	0	0	0	0	0	0	0	1716	13	0	0	0	1	0
92	61	32	17	8	2	0	1	1	4	1	0	0	0	1	0	3	0	0	0	0	0	0	1702	1	0	0	1	1	0
116	69	45	15	7	1	0	1	0	1	1	0	0	1	0	0	1	0	0	2	0	0	0	2154	2	0	0	0	1	0
74	46	26	20	5	1	0	1	3	5	1	0	0	1	0	3	1	0	0	0	0	0	0	1350	1	0	0	3	0	0
96	90	33	29	10	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2108	3	2	0	0	0	0
72	60	33	13	10	0	0	6	1	1	1	1	0	2	2	2	0	0	0	0	0	0	1	1469	2	0	0	0	2	0
40	27	11	19	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	752	1	1	0	0	0	0
72	43	29	20	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1550	1	0	0	0	0	0
102	80	44	26	17	1	1	5	6	5	4	0	0	4	10	3	2	0	0	0	0	0	0	1970	2	1	0	0	1	0
73	47	36	19	5	1	0	4	3	2	1	0	0	4	2	2	0	0	0	0	0	0	0	1342	0	0	0	0	0	0
89	39	27	13	11	0	0	1	3	2	0	1	0	3	1	0	2	1	0	0	0	0	0	1243	2	0	0	0	0	0
125	85	59	30	8	5	0	7	4	3	2	0	0	4	4	2	3	0	0	1	0	0	0	2300	6	2	0	0	0	0
61	38	16	7	4	2	1	7	1	5	3	1	0	9	2	4	5	2	0	0	0	0	0	1046	6	0	0	3	1	0
115	70	45	21	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2117	4	0	0	0	1	0
101	75	63	24	11	2	0	3	1	1	1	0	0	2	0	0	1	0	0	0	0	0	0	2298	3	1	0	0	0	0
77	49	33	16	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1456	5	0	0	0	0	0
2931	1860	1195	660	264	57	7	91	69	70	48	20		100	63	60	35	14		4	1		2	53357	113	16	4	12	22	
95	69	41	24	10	4	1	1	1	4	1	1	0	0	1	1	0	1	0	0	0	3	1	1595	1	0	0	0	0	0
122	81	43	30	15	7	1	10	14	11	8	5	0	5	15	8	5	6	1	0	0	0	0	1811	3	1	3	2	2	0
73	57	44	18	5	2	0	7	13	11	4	5	0	1	13	9	2	5	0	0	0	0	0	1532	19	1	0	1	2	0
64	54	28	14	4	4	0	15	8	13	2	5	0	10	15	13	6	3	1	0	0	0	0	1262	41	0	0	2	0	0
135	74	42	47	20	1	1	11	9	11	11	1	0	8	6	14	7	2	0	0	0	0	0	2192	1	0	0	0	0	0
90	56	49	21	9	5	0	10	10	7	2	0	0	7	8	4	2	0	0	0	0	0	0	1782	7	0	0	0	0	0
38	17	13	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	103	0	0	0	0	0
133	78	42	29	11	5	0	16	18	14	8	7	1	14	14	13	15	5	0	0	0	0	0	2266	16	0	0	0	0	0
64	40	30	13	7	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1047	0	0	0	1	1	0
95	60	52	30	11	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1670	0	0	0	0	0	0
64	42	33	24	9	0	0	11	12	9	7	2	0	7	9	6	11	2	0	0	0	0	0	1344	0	0	0	0	0	0
126	70	41	28	32	5	0	49	42	25	19	13	0	36	20	34	15	8	2	0	0	0	0	2178	2	0	0	0	0	0
111	81	53	32	18	5	0	1	2	0	1	0	0	3	1	0	1	0	0	0	0	0	0	1968	0	0	0	1	0	0
25	19	10	4	3	0	0	3	2	5	4	1	0	4	2	4	1	3	0	0	0	0	0	531	11	0	1	0	0	1
71	37	29	14	10	0	0	0	2	1	1	0	0	1	3	0	0	0	0	0	0	0	0	1201	0	0	0	0	0	0
96	55	33	16	10	1	0	13	17	8	6	0	0	12	15	11	12	2	0	0	0	0	0	1344	2	0	0	1	0	0
104	48	30	22	12	1	0	4	5	3	7	2	0	2	7	3	2	3	0	0	0	0	0	1522	0	0	0	0	0	0
90	83	50	21	10	1	0	0	3	0	1	1	0	2	3	0	1	0	0	0	0	0	0	2049	167	0	0	0	0	0
106	66	68	33	12	3	2	4	1	1	2	0	0	1	0	0	1	0	0	0	0	0	0	1838	0	0	0	0	0	0
95	73	43	32	17	9	1	2	2	1	3	0	0	3	3	0	0	1	0	0	0	0	0	1719	0	0	0	0	0	0
96	80	62	31	10	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2012	1	0	0	0	0	0
139	94	64	34	18	6	0	22	20	11	17	9	0	13	21	16	7	4	0	0	0	0	0	2659	358	0	0	0	0	0
68	52	30	15	5	3	0	3	5	2	5	3	0	5	7	4	2	1	0	0	0	0	0	1228	6	0	0	0	2	0
111	83	52	32	17	4	0	2	0	1	0	0	0	2	0	1	0	0	0	0	0	0	0	2078	0	0	0	0	0	0
76	49	37	23	7	1	0	2	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1643	121	0	0	0	1	0
75	64	36	29	11	2	0	4	6	12	5	0	0	8	3	6	2	2	0	0	0	0	1	1504	18	0	0	0	0	0
59	44	34	12	12	3	1	4	5	4	0	4	0	1	9	3	2	1	0	0	0	0	0	1137	0	0	0	0	0	0
40	17	21	16	8	1	0	5	5	8	3	0	0	2	3	4	1	0	0	0	0	0	0	708	0	0	0	0	0	0
17	25	15	7	1	0	0	1	3	0	3	1	0	2	3	0	1	0	0	0	1	1	0	511	0	0	0	0	0	0
40	32	14	13	6	2	1	2	2	5	0	1	0	6	3	3	1	0	0	0	0	0	0	659	0	0	0	0	0	0
2518	1700	1139	672	321	82	9	203	207	169	120	51	1	155	185	158	98	50	4		1	4	1	45740	877	2	4	8	8	1

MESSAGE FROM THE GOVERNOR.

Approving of the bill entitled "An Act to continue the improvement of the state by Canals and Rail Roads."

READ IN THE HOUSE OF REPRESENTATIVES, March 21, 1831.

To the Senate and House of Representatives of the Commonwealth of Pennsylvania.

Gentlemen:—The bill, entitled "An act to continue the improvement of the state by Canals and Rail Roads," has been in my possession since the twelfth instant; and has received that deliberate consideration to which the magnitude and importance of its provisions entitle it, and which our constituents had a right to expect it would receive before it should be approved and become a law.

In the message transmitted to the two Houses at the opening of the present session of the legislature, the propriety of confining the appropriations for objects of internal improvement for the current year to the connecting links of the main route from Philadelphia to Pittsburg, with a view to complete a connected line of communication between those two important points, was pressed upon the attention of the legislature, from an honest conviction on my part that the substantial interests as well as the true policy of the commonwealth would be best promoted by pursuing that course: and that at most, in addition to the completion of the main line, the North and West Branch divisions of the canal should be extended into the coal regions towards which they severally tend, in order that the utility and public advantages of these several public works might be tested at as early a period as possible, and that they might soon be made to contribute, in some measure, to the increase of the revenues of the state. The commencement of any new project of improvement was at the same time deprecated and considered, then, as now, as being entirely impolitic; as tending to embarrass and delay the operations of the government in completing any portion of the public works, and as manifestly calculated to produce an effect which instead of infusing confidence into the public mind that some advantages will be speedily realized by the public, and that the treasury will soon receive some return from these improvements, as an earnest that the sums which have from time to time been drawn from it have not been expended in vain, would tend to dampen the ardour with which our citizens were heretofore animated in favour of and to impair their confidence in a system of improvements which if conducted upon right principles, would not fail to inspire both.

But although such were and still continue to be the convictions of my own mind, a majority of the legislature has thought proper to pursue a different course, and to authorise, by the bill now under consideration, the commencement of two new routes of canal, of no inconsiderable magnitude, (should they be carried to the extent contemplated,) and liberal appropriations have been authorized with a view to those objects.

Inasmuch, however, as this is a question involving no constitutional principle, nor presenting a case glaringly inexpedient, but exhibiting the naked question in how far it is expedient at this time to enter into new contracts, to what extent the commencement of new projects of improvement shall be authorized, and the amount of money necessary to carry them into effect, about all which there may well exist an honest difference of opinion, I feel myself bound by the respect which I trust I shall always entertain for the opinions of the legislature, when fairly expressed, to yield my judgment to theirs, believing, as I do, that the constitution never contemplated that the negative upon all laws with which it has armed the executive, should be interposed in a case circumstanced like the present—a question of sheer expediency.

The question of the greatest difficulty, and which is calculated to create more embarrassment, in the operations of the government, in relation to the system of internal improvements, is that relating to a fund for the payment of the interest on the public debt. The same difficulty would have existed, however, to a certain extent, if the bill in question had never been passed. A crisis has been produced in the affairs of the commonwealth, which must be met by those entrusted with the concerns of the government, and the direction of its affairs; and although it has been brought about by no act of ours it will nevertheless be our duty to meet it honestly, and with firmness, and to provide the means, to guard against any injurious effects or consequences which it might otherwise be calculated to produce. If justice to the public creditors, as well as a proper regard for the faith and credit of the commonwealth would have required, that an adequate source of revenue for the payment of interest should have been provided, under the circumstances in which we were placed before the passing of the bill now under consideration, it can scarcely be necessary to remind an enlightened legislature of the additional obligations imposed upon them by the provision of the bill which gave rise to this communication, to provide an ample interest fund.

With a firm reliance upon the integrity and patriotism of the members of the Legislature of Pennsylvania, to whom this communication is addressed, and feeling assured that the faith and credit of the state are objects of their anxious solicitude, I have every reason to believe, that this legislature will not consent to separate, until it shall have provided such ample means for raising a revenue as will place the credit of the commonwealth forever hereafter on a bssis which cannot be shaken.

Under these considerations, and under a firm conviction, that a contrary course would be productive of consequences destructive to the best interests of this commonwealth, I have this day approved and signed the said bill, entitled, "An act to continue the improvement of the state by Canals and Rail Roads;" and directed the Secretary of the Commonwealth to return the same to the House of Representatives, in which it originated.

GEO. WOLF.

Harrisburg, March 21, 1831.

Yesterday morning (March 21st), the books for subscription to the stock of the Norristown and Philadelphia rail-road were opened at Heiskell & Niblo's Hotel, in Third street. At an early hour large numbers had assembled with a view of securing for their employers a desired amount of stock—But, the numbers increased so fast, without any diminution of zeal, that when the books were opened, a scene of confusion and clamor ensued that was more amusing to spectators than comfortable to participants. We understand that very large premiums were offered to those who had secured the registry of their names to several shares; although it was not known that one tenth of the amount subscribed for could be awarded.—*U. S. Gaz.*

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The following is the number of shares subscribed to the Philadelphia and Norristown Rail Road stock on Monday. The whole number of shares required is eight thousand.

At Philadelphia, - - -	5037
Norristown, - - -	4815
Germantown, - - -	3350
	13,202

Stock.—We learn with pleasure, that in the scramble for stock yesterday, several hundered shares of the Danville and Pottsville Rail-road Company were subscribed for at the Coffee House.—*U. S. Gaz.*

☞ On the 22d, books were opened for the West Chester Rail-road, and in less than half an hour the whole stock, upwards of 2000 shares, was taken.